APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,708	01/19/2005	Gwenaelle Marquant	FR 020077	9227

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EXAMINER
YEH, EUENG NAN

ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
10/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/521,708	MARQUANT ET AL.
	Examiner	Art Unit	
	Eueng-nan Yeh	2624	

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-7_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-7_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _19 January 2005_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Priority

1.   Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which

papers have been placed of record in the file.

Specification

2.   The title of the invention, "Method and encoder for coding a digital video signal" is

too general to reveal the real intention to which the claims are directed. A new title is

suggested: "A system for coding a digital video signal with adaptive quantizer".

3.   The abstract of the disclosure is objected to because it is in the wrong format.

The abstract should be in a brief narrative of the disclosure as a whole and generally

limited to a single paragraph on a separate sheet within the range of 50 to 150 words.

Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 101

4.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or
> composition of matter, or any new and useful improvement thereof, may obtain a patent
> therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent

Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV,

reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 4 and 5 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claims 4 and 5 define a computer program embodying functional descriptive material. However, the claims do not define a computer-readable medium or computer-readable memory and are thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claims to embody the program on "computer-readable

medium" or equivalent such as "A computer readable medium encoded with ..."; assuming the specification does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission medium" which are deemed non-statutory (refer to "note" below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

A "signal" (or equivalent) embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of § 101. Rather, "signal" is a form of energy, in the absence of any physical structure or tangible material.

Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a "signal", the claim as a whole would be non-statutory. In the case where the specification defines the computer readable medium or memory as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as a non-statutory entity such as a "signal", "carrier wave", or "transmission medium", the examiner suggests amending the claim to *include* the disclosed tangible computer readable media, while at the same time *excluding* the intangible media such as signals, carrier waves, etc.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described
as set forth in section 102 of this title, if the differences between the subject matter sought to be
patented and the prior art are such that the subject matter as a whole would have been obvious
at the time the invention was made to a person having ordinary skill in the art to which said
subject matter pertains. Patentability shall not be negatived by the manner in which the
invention was made.

6.   Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the

combination of Sethuraman (US 6,563,549 B1) and Sugiura (US 5,841,904).

Regarding claims 1 (method) and 6 (encoder), Sethuraman discloses a coding

system comprising:

transforming said video sequence from the original spatial representation domain into

fewer representation data comprising transformed luminance values (as depicted in

figure 1, numeral 101: "First encoding module 101 comprises ... a discrete cosine

transform (DCT) module 110P, a quantizer (Q) module 115P ..." at column 4, line 29.

"In the case of the input information stream IN comprising a video information stream,

the video information stream represents a sequence of images on the input signal path

IN which is digitized and represented as, illustratively a luminance and two color

difference signals (Y, Cr, Cb) in accordance with the MPEG standards" at column 4, line

45. Thus, this system will transform luminance values into fewer representation data

through DCT module and quantizer module to perform data compression);

performing a quantization on the representation data so as to obtain a reduced set of

data, characterized in that said quantization step performs a quantization of the

luminance component according to a visible range of transformed luminance values of

said luminance component in order to obtain said reduced set of data (as depicted in

figure 1, "quantizer module 115P quantizes the received DCT coefficients to produce a

quantized output block ... The quantization values can be set individually for each DCT

coefficient, using criteria based on the visibility of the basis functions (known as visually

weighted quantization). Namely, the quantization value corresponds to the threshold for

visibility of a given basis function, i.e., the coefficient amplitude that is just detectable by

the human eye. By quantizing the DCT coefficients with this value, many of the DCT

coefficients are converted to the value "zero", thereby improving image compression

efficiency" at column 5, line 59).

Sethuraman discloses a coding system with quantization process based on

visible range of transformed luminance values such that many DCT coefficients outside

the visible range are converted to the value zero.

Sethuraman does not explicitly disclose an adaptive way to do the quantization.

Sugiura, in the same field of endeavor of image processing ("a method of

expanding compressed image data" at column 1, line 11), teaches a quantization table

corresponding to special frequency intervals as depicted in Sugiura figure 5, numeral

504a "... If the image quality is important, it is necessary to transmit image data up to

high frequency components. If the transmission efficiency is to be improved with some

sacrifice on image quality, it is necessary to finely quantize high frequency components

or cut off small data. A quantization table 504a determines how efficiently the high

frequency components are to be transmitted. Each frequency component is weighted

using the quantization table ..." at column 2, line 43. Thus, the quantization table can

be uitlized to set up separate sub-quantizers for each segment with specific features are

associated.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to provide the coding system Sethuraman made with features related quantization table as taught by Sugiura, in order to display major features with desired quality.

Regarding claim 2, the quantization step is performed by:

applying a heavy weight to the transformed luminance values in the visible range (discussed in claim 1, the Sethuraman and Sugiura combination teaches "... the quantization value corresponds to the threshold for visibility ..." at Sethuraman column 5, line 67 and "... Each frequency component is weighted using the quantization table ..." at Sugiura column 2, line 50. Wherein the frequency component is the DCT coefficient, i.e. the transformed luminance value);

computing the probability of transformed luminance values appearance within the luminance component (as discussed in claim 1, at Sethuraman column 6, line 3 "... quantizing the DCT coefficients with this value, many of the DCT coefficients are converted to the value "zero" ...". This is to say that no reproduction values in locations at which the probability of DCT coefficients, i.e. transformed luminance values, is outside the visible range. Other data, with the probability of DCT coefficients within the visible range can then be calculated);

transforming the representation data into said reduced set of data according to said probability of values appearance (as depicted in Sethuraman figure 1, numeral 115P to

quantize the said probability of DCT coefficients to become a compressed and reduced set of data).

Regarding claim 3, using coarse quantization points for the transformed luminance values outside the visible range (discussed in claim 1 for quantization process with reference to visible range, "... quantizing the DCT coefficients with this value, many of the DCT coefficients are converted to the value "zero" ..." at Sethuraman column 6, line 3. Accordingly, coarse quantization step sizes apply to the transformed luminance values, i.e. DCT coefficients, outside the visible range); using fine quantization points for the transformed luminance values within the visible range (discussed in claim 1, "... it is necessary to finely quantize high frequency components ..." at Sugiura column 2, line 46. This is to say that the quantization table needs to refine the step size for DCT coefficients within the visible range).

Regarding claims 4 and 5, a computer program to carry out the method as claimed in claims 1 to 3 ("The present invention can be embodied in the form of computer-implemented processes and apparatuses for practicing those processes. The present invention also can be embodied in the form of computer program code embodied in tangible media, such as floppy diskettes, CD-ROMs, hard drives, or any other computer readable storage medium, wherein, when the computer program code is loaded into and executed by a computer, the computer becomes an apparatus for practicing the invention ..." at Sethuraman column 18, line 31).

Regarding claim 7, a video communication system, which is able to receive an input digital video signal, said signal being coded by the encoder defined in claim 6 (as depicted in Sethuraman figure 1, numeral 100 is the video communication system "The MPEG-like encoding system 100 receives and encodes an input information stream IN comprising a plurality of uncompressed information frames, illustratively a sequence of images forming a video information stream, to produce an encoded output information stream OUT" at Sethuraman column 3, line 23).

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

o   Musmann et al. (Proceedings of the IEEE, Vol. 73, No. 4, April 1985, 523-551): within the visibility threshold the quantization of the probability density function of the prediction error has been optimized with the modification of visual weighting function.

8.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eueng-nan Yeh whose telephone number is 571-270-1586. The examiner can normally be reached on Monday-Friday 8AM-4:30PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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2624

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